

TABLE E-2
TERRESTRIAL PLANT TOXICITY REFERENCE VALUES

Constituent	Basis for Toxicity Reference Value (TRV)				TRV ^c	Reference and Explanation ^d
	Duration and Endpoint ^a	Test Organism	Concentration	Uncertainty Factor ^b		
Dioxins and furans (Φg/kg)						
2,3,7,8-TCDD (compare to 2,3,7,8-TCDD toxicity equivalence concentration)	--	--	--	--	--	Screening or toxicity value not identified.
Polycyclic aromatic hydrocarbons (PAH) (Φg/kg)						
Total high molecular weight (HMW) PAH	Chronic no observed adverse effect level (NOAEL)	Wheat	1,200	Not applicable	1,200	Benzo(a)pyrene toxicity used as representative toxicity of all HMW PAHs. This TRV may be used to characterize risk of total HMW PAHs to terrestrial plants.
Benzo(a)pyrene	Chronic NOAEL	Wheat	1,200	Not applicable	1,200	Sims and Overcash (1983).
Benzo(a)anthracene	Not available	--	--	--	1,200	Screening or toxicity value not available. Benzo(a)pyrene used as surrogate.
Benzo(b)fluoranthene	Chronic NOAEL	Wheat	1,200	Not applicable	1,200	Sims and Overcash (1983).
Benzo(k)fluoranthene	Not available	--	--	--	1,200	Screening or toxicity value not available. Benzo(a)pyrene used as surrogate.

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Chrysene	Not available	--	--	--	1,200	Screening or toxicity value not available. Benzo(a)pyrene used as surrogate.
Dibenz(a,h)anthracene	Not available	--	--	--	1,200	Screening or toxicity value not available. Benzo(a)pyrene used as surrogate.
Indeno(1,2,3-cd)pyrene	Not available	--	--	--	1,200	Screening or toxicity value not available. Benzo(a)pyrene used as surrogate.
Polychlorinated biphenyls (PCB) ($\mu\text{g}/\text{kg}$)						
Aroclor 1016	Not available	--	--	--	10,000	No toxicity data available. Aroclor 1254 TRV adopted as surrogate.
Aroclor 1254	Chronic NOAEL	Soybean shoot weight	10,000	Not applicable	10,000	Value for toxicity of Aroclor 1254 (Weber and Mrozek 1979).
Nitroaromatics ($\mu\text{g}/\text{kg}$)						
1,3-Dinitrobenzene	--	--	--	--	--	Screening or toxicity value not available.
2,4-Dinitrotoluene	--	--	--	--	--	Screening or toxicity value not available.

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2,6-Dinitrotoluene	--	--	--	--	--	Screening or toxicity value not available.
Nitrobenzene	--	--	--	--	--	Screening or toxicity value not available.
Pentachloronitrobenzene	--	--	--	--	--	Screening or toxicity value not available.
2,4,6-Trinitrotoluene	Lowest Observed Effect Concentration (LOEC)	Blando brome grass growth	30,000	0.1	3,000	Value based on soil exposure to plants (Cataldo and others 1989), as cited in Talmage and others (1999).
Phthalate esters ($\mu\text{g/kg}$)						
Bis(2-ethylhexyl)phthalate	--	--	--	--	--	Screening or toxicity value not available.
Di-n-butylphthalate	LOEC	Corn and Fescue growth	200,000	0.1	20,000	Efryomson et al. 1997, as cited by U.S. EPA Region 4 (U.S. U.S. EPA 2000).
Diethylphthalate	Median Effective Concentration (EC50)	Lettuce growth	134,000	0.01	1,340	Efryomson et al. 1997, as cited by U.S. U.S. EPA Region 4 (U.S. U.S. EPA 2000).
Di(n)octyl phthalate	--	--	--	--	--	Screening or toxicity value not available.

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Volatile organic compounds (µg/kg)						
Acetone	--	--	--	--	--	Screening or toxicity value not available.
Acrylonitrile	--	--	--	--	--	Screening or toxicity value not available.
Bromoform	--	--	--	--	--	Screening or toxicity value not available.
Chloroform	--	--	--	--	--	Screening or toxicity value not available.
Crotonaldehyde	--	--	--	--	--	Screening or toxicity value not available.
1,4-Dioxane	--	--	--	--	--	Screening or toxicity value not available.
Ethylbenzene	Lowest Effect Level (LEL)	Not reported	0.05	0.1	0.005	Beyer (1990) and Ministry of Housing, Spatial Planning, and Environment (1994), as cited by U.S. U.S. EPA Region 4 (U.S. U.S. EPA 2000).
Formaldehyde	--	--	--	--	--	Screening or toxicity value not available.

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n-Hexane	--	--	--	--	--	Screening or toxicity value not available.
1,1,2,2-Tetrachloroethane	--	--	--	--	--	Screening or toxicity value not available.
Vinyl chloride	--	--	--	--	--	Screening or toxicity value not available.
Semi-volatile organic compounds ($\mu\text{g/kg}$)						
Benzoic acid	--	--	--	--	--	Screening or toxicity value not available.
Benzyl alcohol	--	--	--	--	--	Screening or toxicity value not available.
Inorganics (mg/kg)						
Aluminum	Subchronic NOAEL	White clover seedling establishment	50	0.1 ^e	5	Mackay and others (1990).
Antimony	Not specified	Not specified	5	0.1 ^e	0.5	Kabata-Pendias and Pendias (1984).
Arsenic	Chronic (4-week) LOAEL	Corn yield (weight)	10	0.1	1	Woolson and others (1971).

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Barium	Chronic (14-day); adverse effect observed in all treatments	Barley shoot growth	500	0.01 ^e	5	Chaudry and others (1977).
Beryllium	Not specified	Not specified	10	0.01 ^e	0.1	Kabata-Pendias and Pendias (1984).
Boron	Chronic (7-week) LOAEL	Corn seedling growth	0.5	0.1	0.05	Efryomson et al. 1997, as cited by U.S. U.S. EPA Region 4 (U.S. EPA 2000).
Cadmium	Chronic (14-week) LOAEL	Spruce seedling growth	2	0.1 ^e	0.2	Burton and others (1984).
Chromium (hexavalent)	Subchronic (14-day) EC50	Lettuce growth	1.8	0.01	0.018	Adema and Hazen (1989).
Copper	Chronic (33-day) LOAEL	Barley	10	0.1	1.0	Toivonem and Hofstra (1979).
Cyanide, total	--	--	--	--	--	Screening or toxicity value not available.
Lead	Chronic LOAEL	Senna	46	0.1	4.6	Krishnayya and Bedi (1986).
Mercury	Not specified	Not specified	0.3	0.01 ^e	0.003	Kabata-Pendias and Pendias (1984).

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Methyl mercury	--	--	--	--	--	Screening or toxicity value not available.
Nickel	Chronic (28-day) NOAEL	Bush bean shoot growth	25	Not applicable	25	Wallace and others (1977).
Selenium	Subchronic (partial life-cycle) NOAEL	Alfalfa shoot weight	0.5	0.1	0.05	Wan and others (1988).
Silver	Not specified	Not specified	2	0.01 ^e	0.02	Kabata-Pendias and Pendias (1984).
Thallium	Not specified	Not specified	1	0.01 ^e	0.01	Kabata-Pendias and Pendias (1984).
Zinc	Chronic (19-day) LOAEL	Spring barley	9	0.1	0.9	Davis, Beckett, and Wollan (1978).
Other compounds (mg/kg)						
Cyclotrininitramine-methylene (RDX)	LOEC	Reduced biomass in cucumber plant	100	0.1	10	Value based on soil exposure to plants (Simini and others 1992), as cited in Talmage and others (1999).
Decane	--	--	--	--	--	Screening or toxicity value not available.

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GB (Sarin)	--	--	--	--	--	Screening or toxicity value not available.
VX	--	--	--	--	--	Screening or toxicity value not available.
Sulfur mustard	--	--	--	--	--	Screening or toxicity value not available.

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Notes:

- a To evaluate exposure duration, the following general guidelines were used: Chronic duration represents exposures occurring about 10 or more days, including exposure during a critical life stage, such as germination and shoot development. Subchronic duration generally lasts 2 days through several days, however a sensitive life stage is not exposed. Acute duration generally includes exposures occurring 0 to 2 days.
 - b Uncertainty factors are used to extrapolate a toxicity value to a chronic NOAEL TRV.
 - c TRV was calculated by multiplying the regulatory or toxicity value with the uncertainty factor.
 - d The references refer to the source of the regulatory or toxicity value. Complete reference citations are provided at the end of this appendix.
 - e Best professional judgment was used to identify uncertainty factor. Factors evaluated include test duration, ecological relevance of endpoint, and experimental design.
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